

## CLAIMS

1. A display apparatus, comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes; video  
5 signal electrodes; common electrodes; a counter electrode; a display medium interposed between the pixel electrodes and the counter electrode; and storage capacitance formed between the pixel electrodes and the common electrodes,  
wherein, in a case where a scanning electrode – pixel electrode  
capacitance between the pixel electrodes and the scanning electrodes is  
10 represented by  $C_{gd}$ , a common electrode – pixel electrode capacitance between the pixel electrodes and the common electrodes is represented by  $C_{st}$ , and a total capacitance connected electrically to the pixel electrodes is represented by  $C_{tot}$ ,  
 $\alpha_{gd}$  and  $\alpha_{st}$  represented by  
15 
$$\alpha_{gd} = C_{gd}/C_{tot}, \quad \alpha_{st} = C_{st}/C_{tot} \quad (\text{Formula 1})$$
  
are set to be different values between a portion close to feeding ends in a screen and a portion away therefrom.  
20  
2. A display apparatus according to claim 1, comprising a video signal driving circuit for applying two kinds of video signals having different polarities to video signal electrodes in accordance with a display period.  
25  
3. A display apparatus according to claim 2, comprising a common electrode potential control circuit for applying a voltage signal to a plurality of common electrodes and a scanning signal driving circuit for applying a voltage signal to a plurality of scanning electrodes, the common electrode potential control circuit has output potential levels of at least two values, and the scanning  
30 signal driving circuit has output potential levels of at least two values.  
4. A display apparatus according to claim 3, wherein a potential of a scanning electrode becomes a first potential level  $V_{gon}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{goff}$  during a  
35 retention period in which the scanning electrode is not selected,  
a potential of a common electrode that is a connection destination of storage capacitance connected to pixel electrodes of a plurality of pixels

belonging to the scanning electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected, and

5           in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

10            $\gamma$  represented by

$$\gamma = \alpha_{st} V_{cp} / 2 \quad \text{(Formula 2)}$$

$$\text{(where } V_{cp} = \Delta V_c(+) - \Delta V_c(-) \text{)} \quad \text{(Formula 3)}$$

15           is set to be smaller in the portion away from the feeding ends in the screen, compared with the portion close thereto.

20           5. A display apparatus according to claim 4, wherein, assuming that a value of  $\gamma$  in the portion close to the feeding ends in the screen is  $\gamma(O)$ , a value of  $\gamma$  in the portion away from the feeding ends in the screen is  $\gamma(E)$ , and a value of  $\gamma$  in a portion in a middle therebetween in terms of a distance is  $\gamma(M)$ ,  $\gamma(M)$  is smaller than  $[\gamma(O) + \gamma(E)]/2$ .

25           6. A display apparatus according to claim 4, wherein  $V_{cp}$  takes a negative value.

30           7. A display apparatus according to claim 3, wherein a potential of a scanning electrode becomes a first potential level  $V_{gon}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{goff}$  during a retention period in which the scanning electrode is not selected,

35           a potential of a common electrode that is a connection destination of storage capacitance connected to pixel electrodes of a plurality of pixels belonging to the scanning electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected, and

          in a case where a difference between the first potential level  $V_c(+)$  of

the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

5  $\beta$  represented by

$$\beta = \alpha_{gd} + \alpha_{st} (\Delta V_{oc} / \Delta V_{gon}) \quad (\text{Formula 4})$$

$$(\text{where } \Delta V_{gon} = V_{gon} - V_{goff}, \Delta V_{oc} = [\Delta V_c(+) + \Delta V_c(-)]/2 \quad (\text{Formula 5}))$$

10 is set to be larger in the portion away from the feeding ends in the screen, compared with the portion close thereto.

15 8. A display apparatus according to claim 7, wherein, assuming that a value of  $\beta$  in the portion close to the feeding ends in the screen is  $\beta(O)$ , a value of  $\beta$  in the portion away from the feeding ends in the screen is  $\beta(E)$ , and a value of  $\beta$  in a portion in a middle therebetween in terms of a distance is  $\beta(M)$ ,  $\beta(M)$  is larger than  $[\beta(O) + \beta(E)]/2$ .

20 9. A display apparatus according to claim 7, wherein  $\Delta V_{oc}$  is negative.

10. A display apparatus according to claim 3, wherein a potential of a scanning electrode becomes a first potential level  $V_{gon}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{goff}$  during a retention period in which the scanning electrode is not selected,  
25 a potential of a common electrode that is a connection destination of storage capacitance connected to pixel electrodes of a plurality of pixels belonging to the scanning electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the  
30 scanning electrode is selected,

in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

35  $\gamma$  represented by

$$\gamma = \alpha_{st} V_{cp}/2 \quad (\text{Formula 2})$$

$$(\text{where } V_{cp} = \Delta V_c(+) - \Delta V_c(-) \quad (\text{Formula 3}))$$

is set to be smaller in the portion away from the feeding ends in the screen,  
5 compared with the portion close thereto, and  
     $\beta$  represented by

$$\beta = \alpha_{gd} + \alpha_{st} (\Delta V_{cc}/\Delta V_{gon}) \quad (\text{Formula 4})$$

$$(\text{where } \Delta V_{gon} = V_{gon} - V_{goff}, \quad \Delta V_{cc} = [\Delta V_c(+) + \Delta V_c(-)]/2 \quad (\text{Formula 5}))$$

10 is set to be larger in the portion away from the feeding ends in the screen,  
compared with the portion close thereto.

11. A display apparatus, comprising: a plurality of pixel electrodes arranged in  
15 a matrix; switching elements connected thereto; scanning electrodes; video  
signal electrodes; common electrodes; a counter electrode; a display medium  
interposed between the pixel electrodes and the counter electrode; and storage  
capacitance formed between the pixel electrodes and the common electrodes, a  
20 plurality of the common electrodes that are connection destinations of the  
storage capacitance being connected to the pixel electrodes of a plurality of  
pixels belonging to one of the scanning electrodes,

wherein, in a case where a scanning electrode – pixel electrode  
capacitance between the pixel electrodes and the scanning electrodes is  
represented by  $C_{gd}$ , a common electrode – pixel electrode capacitance between  
25 the pixel electrodes and the common electrodes is represented by  $C_{st}$ , and a  
total capacitance connected electrically to the pixel electrodes is represented  
by  $C_{tot}$ ,

$\alpha_{gd}$  and  $\alpha_{st}$  represented by

$$30 \quad \alpha_{gd} = C_{gd}/C_{tot}, \quad \alpha_{st} = C_{st}/C_{tot} \quad (\text{Formula 1})$$

are set to be different values between a portion close to feeding ends in a  
screen and a portion away therefrom.

35 12. A display apparatus according to claim 11, comprising a video signal  
driving circuit for simultaneously applying two kinds of video signals having  
different polarities to a plurality of video signal electrodes, and applying two

kinds of video signals having different polarities to each of the video signal electrodes in accordance with a display period.

13. A display apparatus according to claim 12, comprising a first common  
5 electrode that is a connection destination of storage capacitance connected to pixel electrodes of pixels belonging to a video signal electrode to which a video signal with a first polarity is applied among a plurality of pixels belonging to one of the scanning electrodes, and a second common electrode that is  
10 different from the first common electrode and is a connection destination of the storage capacitance connected to the pixel electrodes of the pixels belonging to the video signal electrode to which the video signal with a second polarity is applied.

14. A display apparatus according to claim 13, comprising a common electrode  
15 potential control circuit for applying a voltage signal to a plurality of common electrodes and a scanning signal driving circuit for applying a voltage signal to a plurality of scanning electrodes, the common electrode potential control circuit has output potential levels of at least two values, and the scanning  
20 signal driving circuit has output potential levels of at least two values.

15. A display apparatus according to claim 14, wherein a potential of a  
scanning electrode becomes a first potential level  $V_{\text{gon}}$  when the scanning  
electrode is selected and becomes substantially a second potential level  $V_{\text{goff}}$   
during a retention period in which the scanning electrode is not selected,

25 among common electrodes that are connection destinations of storage capacitance connected to pixel electrodes of a plurality of pixels belonging to the scanning electrode,

a potential of the first common electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal applied to a video signal  
30 electrode corresponding to the first common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected,

a potential of the second common electrode becomes a first potential  
level  $V_c(+)$  in a case where the polarity of the video signal applied to the video  
35 signal electrode corresponding to the second common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected, and

in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

$\gamma$  represented by

$$\gamma = \alpha_{st} V_{cp} / 2 \quad (\text{Formula 2})$$

$$(\text{where } V_{cp} = \Delta V_c(+) - \Delta V_c(-) \quad (\text{Formula 3}))$$

is set to be smaller in the portion away from the feeding ends in the screen, compared with the portion close thereto.

16. A display apparatus according to claim 15, wherein, assuming that a value of  $\gamma$  in the portion close to the feeding ends in the screen is  $\gamma(O)$ , a value of  $\gamma$  in the portion away from the feeding ends in the screen is  $\gamma(E)$ , and a value of  $\gamma$  in a portion in a middle therebetween in terms of a distance is  $\gamma(M)$ ,  $\gamma(M)$  is smaller than  $[\gamma(O) + \gamma(E)]/2$ .

17. A display apparatus according to claim 15, wherein  $V_{cp}$  is negative.

18. A display apparatus according to claim 14, wherein a potential of a scanning electrode becomes a first potential level  $V_{gon}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{goff}$  during a retention period in which the scanning electrode is not selected, among common electrodes that are connection destinations of storage capacitance connected to pixel electrodes of a plurality of pixels belonging to the scanning electrodes,

a potential of the first common electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal applied to a video signal electrode corresponding to the first common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected,

a potential of the second common electrode becomes a first potential level  $V_c(+)$  in a case where the polarity of the video signal applied to the video signal electrode corresponding to the second common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is

negative, when the scanning electrode is selected, and

in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

$\beta$  represented by

$$\beta = \alpha_{gd} + \alpha_{st} (\Delta V_{\alpha} / \Delta V_{gon}) \quad (\text{Formula 4})$$

$$(\text{where } \Delta V_{gon} = V_{gon} - V_{goff}, \quad \Delta V_{\alpha} = [\Delta V_c(+) + \Delta V_c(-)]/2 \quad (\text{Formula 5}))$$

is set to be larger in the portion away from the feeding ends in the screen, compared with the portion close thereto.

19. A display apparatus according to claim 18, wherein, assuming that a value of  $\beta$  in the portion close to the feeding ends in the screen is  $\beta(O)$ , a value of  $\beta$  in the portion away from the feeding ends in the screen is  $\beta(E)$ , and a value of  $\beta$  in a portion in a middle therebetween in terms of a distance is  $\beta(M)$ ,  $\beta(M)$  is larger than  $[\beta(O) + \beta(E)]/2$ .

20. A display apparatus according to claim 18, wherein  $\Delta V_{\alpha}$  is negative.

21. A display apparatus according to claim 14, wherein a potential of a scanning electrode becomes a first potential level  $V_{gon}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{goff}$  during a retention period in which the scanning electrode is not selected,

among common electrodes that are connection destinations of storage capacitance connected to pixel electrodes of a plurality of pixels belonging to the scanning electrodes,

a potential of the first common electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal applied to a video signal electrode corresponding to the first common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected,

a potential of the second common electrode becomes a first potential level  $V_c(+)$  in a case where the polarity of the video signal applied to the video signal electrode corresponding to the second common electrode is positive and

a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected,

in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

$\gamma$  represented by

$$\gamma = \alpha_{st} V_{cp}/2 \quad (\text{Formula 2})$$

$$(\text{where } V_{cp} = \Delta V_c(+) - \Delta V_c(-) \quad (\text{Formula 3}))$$

is set to be smaller in the portion away from the feeding ends in the screen, compared with the portion close thereto, and

$\beta$  represented by

$$\beta = \alpha_{gd} + \alpha_{st} (\Delta V_{cc}/\Delta V_{gon}) \quad (\text{Formula 4})$$

$$(\text{where } \Delta V_{gon} = V_{gon} - V_{goff}, \quad \Delta V_{cc} = [\Delta V_c(+) + \Delta V_c(-)]/2 \quad (\text{Formula 5}))$$

is set to be larger in the portion away from the feeding ends in the screen, compared with the portion close thereto.

22. A display apparatus, comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes; video signal electrodes; common electrodes; a display medium interposed between the pixel electrodes and the common electrodes; and storage capacitance formed between electrodes, other than the common electrodes opposing the pixel electrodes via the display medium and the scanning electrodes of the stage concerned, and the pixel electrodes,

wherein, in a case where a scanning electrode – pixel electrode capacitance between the pixel electrodes and the scanning electrodes is represented by  $C_{gd}$ , a common electrode – pixel electrode capacitance between the pixel electrodes and the common electrodes is represented by  $C_{lc}$ , and a total capacitance connected electrically to the pixel electrodes is represented by  $C_{tot}$ ,

$\alpha_{gd}$  and  $\alpha_{lc}$  represented by



$$\alpha_{gd} = C_{gd}/C_{tot}, \quad \alpha_{lc} = C_{lc}/C_{tot} \quad (\text{Formula 6})$$

are set to be different values between a portion close to feeding ends in a screen and a portion away therefrom.

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23. A display apparatus according to claim 22, comprising a video signal driving circuit for applying two kinds of video signals having different polarities to video signal electrodes in accordance with a display period.

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24. A display apparatus according to claim 23, comprising a common electrode potential control circuit for applying a voltage signal to a plurality of common electrodes and a scanning signal driving circuit for applying a voltage signal to a plurality of scanning electrodes, the common electrode potential control circuit has output potential levels of at least two values, and the scanning signal driving circuit has output potential levels of at least two values.

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25. A display apparatus according to claim 24, wherein a potential of a scanning electrode becomes a first potential level  $V_{gon}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{goff}$  during a retention period in which the scanning electrode is not selected,

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a potential of a common electrode that opposes pixel electrodes of a plurality of pixels belonging to the scanning electrode via the display medium becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected, and

25

in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

30

$\gamma$  represented by

$$\gamma = \alpha_{lc} V_{\varphi} / 2 \quad (\text{Formula 7})$$

$$(\text{where } V_{\varphi} = \Delta V_c(+) - \Delta V_c(-)) \quad (\text{Formula 8})$$

35

is set to be smaller in the portion away from the feeding ends in the screen, compared with the portion close thereto.

26. A display apparatus according to claim 25, wherein, assuming that a value of  $\gamma$  in the portion close to the feeding ends in the screen is  $\gamma(O)$ , a value of  $\gamma$  in the portion away from the feeding ends in the screen is  $\gamma(E)$ , and a value of  $\gamma$  in a portion in a middle therebetween in terms of a distance is  $\gamma(M)$ ,  $\gamma(M)$  is smaller than  $[\gamma(O) + \gamma(E)]/2$ .

27. A display apparatus according to claim 25, wherein  $V_{cp}$  is negative.

28. A display apparatus according to claim 24, wherein a potential of a scanning electrode becomes a first potential level  $V_{gon}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{goff}$  during a retention period in which the scanning electrode is not selected, a potential of a common electrode that opposes pixel electrodes of a plurality of pixels belonging to the scanning electrodes via the display medium becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected, and in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

$\beta$  represented by

$$\beta = \alpha_{gd} + \alpha_{lc} (\Delta V_{\infty} / \Delta V_{gon}) \quad (\text{Formula 9})$$

$$(\text{where } \Delta V_{gon} = V_{gon} - V_{goff}, \quad \Delta V_{\infty} = [\Delta V_c(+) + \Delta V_c(-)]/2 \quad (\text{Formula 10}))$$

is set to be larger in the portion away from the feeding ends in the screen, compared with the portion close thereto.

29. A display apparatus according to claim 28, wherein, assuming that a value of  $\beta$  in the portion close to the feeding ends in the screen is  $\beta(O)$ , a value of  $\beta$  in the portion away from the feeding ends in the screen is  $\beta(E)$ , and a value of  $\beta$  in a portion in a middle therebetween in terms of a distance is  $\beta(M)$ ,  $\beta(M)$  is larger than  $[\beta(O) + \beta(E)]/2$ .

30. A display apparatus according to claim 28, wherein  $\Delta V_{\infty}$  is negative.

31. A display apparatus according to claim 24, wherein a potential of a scanning electrode becomes a first potential level  $V_{gon}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{goff}$  during a retention period in which the scanning electrode is not selected,

a potential of a common electrode that opposes pixel electrodes of a plurality of pixels belonging to the scanning electrode via the display medium becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected,

in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

$\gamma$  represented by

$$\gamma = \alpha_{lc} V_{cp} / 2 \quad (\text{Formula 7})$$

$$(\text{where } V_{cp} = \Delta V_c(+) - \Delta V_c(-)) \quad (\text{Formula 8})$$

is set to be smaller in the portion away from the feeding ends in the screen, compared with the portion close thereto, and

$\beta$  represented by

$$\beta = \alpha_{gd} + \alpha_{lc} (\Delta V_{\infty} / \Delta V_{gon}) \quad (\text{Formula 9})$$

$$(\text{where } \Delta V_{gon} = V_{gon} - V_{goff}, \quad \Delta V_{\infty} = [\Delta V_c(+) + \Delta V_c(-)] / 2 \quad (\text{Formula 10}))$$

is set to be larger in the portion away from the feeding ends in the screen, compared with the portion close thereto.

32. A display apparatus, comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes; video signal electrodes; common electrodes; a display medium interposed between the pixel electrodes and the common electrodes; and storage capacitance formed between electrodes, other than the common electrodes opposing the pixel electrodes via the display medium and the scanning electrodes of the

stage concerned, and the pixel electrodes, a plurality of the common electrodes opposing the pixel electrodes of a plurality of pixels belonging to one of the scanning electrodes via the display medium,

wherein, in a case where a scanning electrode – pixel electrode capacitance between the pixel electrodes and the scanning electrodes is represented by  $C_{gd}$ , a common electrode – pixel electrode capacitance between the pixel electrodes and the common electrodes is represented by  $C_{lc}$ , and a total capacitance connected electrically to the pixel electrodes is represented by  $C_{tot}$ ,

$\alpha_{gd}$  and  $\alpha_{lc}$  represented by

$$\alpha_{gd} = C_{gd}/C_{tot}, \quad \alpha_{lc} = C_{lc}/C_{tot} \quad (\text{Formula 6})$$

are set to be different values between a portion close to feeding ends in a screen and a portion away therefrom.

33. A display apparatus according to claim 32, comprising a video signal driving circuit for simultaneously applying two kinds of video signals having different polarities to a plurality of video signal electrodes, and applying two kinds of video signals having different polarities to each of the video signal electrodes in accordance with a display period.

34. A display apparatus according to claim 33, comprising a first common electrode that opposes, via the display medium, pixel electrodes of pixels belonging to a video signal electrode to which a video signal with a first polarity is applied among a plurality of pixels belonging to one of the scanning electrodes, and a second common electrode that is different from the first common electrode and opposes, via the display medium, the pixel electrodes of the pixels belonging to the video signal electrode to which the video signal with a second polarity is applied.

35. A display apparatus according to claim 34, comprising a common electrode potential control circuit for applying a voltage signal to a plurality of common electrodes and a scanning signal driving circuit for applying a voltage signal to a plurality of scanning electrodes, and the common electrode potential control circuit has output potential levels of at least two values, and the scanning signal driving circuit has output potential levels of at least two

values.

36. A display apparatus according to claim 35, wherein a potential of a scanning electrode becomes a first potential level  $V_{\text{gon}}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{\text{goff}}$  during a retention period in which the scanning electrode is not selected,

among common electrodes opposing pixel electrodes of a plurality of pixels belonging to the scanning electrode via a display medium,

a potential of the first common electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal applied to a video signal electrode corresponding to the first common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected,

a potential of the second common electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of the video signal applied to the video signal electrode corresponding to the second common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected, and

in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

$\gamma$  represented by

$$\gamma = \alpha_{1c} V_{\varphi} / 2 \quad (\text{Formula 7})$$

$$(\text{where } V_{\varphi} = \Delta V_c(+) - \Delta V_c(-) \quad (\text{Formula 8}))$$

is set to be smaller in the portion away from the feeding ends in the screen, compared with the portion close thereto.

37. A display apparatus according to claim 36, wherein, assuming that a value of  $\gamma$  in the portion close to the feeding ends in the screen is  $\gamma(O)$ , a value of  $\gamma$  in the portion away from the feeding ends in the screen is  $\gamma(E)$ , and a value of  $\gamma$  in a portion in a middle therebetween in terms of a distance is  $\gamma(M)$ ,  $\gamma(M)$  is smaller than  $[\gamma(O) + \gamma(E)]/2$ .

38. A display apparatus according to claim 36, wherein  $V_{cp}$  is negative.

39. A display apparatus according to claim 35, wherein a potential of a scanning electrode becomes a first potential level  $V_{gon}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{goff}$  during a retention period in which the scanning electrode is not selected,

among common electrodes opposing pixel electrodes of a plurality of pixels belonging to the scanning electrode via a display medium,

a potential of the first common electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal applied to a video signal electrode corresponding to the first common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected,

a potential of the second common electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of the video signal applied to the video signal electrode corresponding to the second common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected, and

in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

$\beta$  represented by

$$\beta = \alpha_{gd} + \alpha_{lc} (\Delta V_{\infty} / \Delta V_{gon}) \quad (\text{Formula 9})$$

$$(\text{where } \Delta V_{gon} = V_{gon} - V_{goff}, \quad \Delta V_{\infty} = [\Delta V_c(+) + \Delta V_c(-)]/2 \quad (\text{Formula 10}))$$

is set to be larger in the portion away from the feeding ends in the screen, compared with the portion close thereto.

40. A display apparatus according to claim 39, wherein, assuming that a value of  $\beta$  in the portion close to the feeding ends in the screen is  $\beta(O)$ , a value of  $\beta$  in the portion away from the feeding ends in the screen is  $\beta(E)$ , and a value of  $\beta$  in a portion in a middle therebetween in terms of a distance is  $\beta(M)$ ,  $\beta(M)$  is larger than  $[\beta(O) + \beta(E)]/2$ .

41. A display apparatus according to claim 39, wherein  $\Delta V_{\infty}$  is negative.

42. A display apparatus according to claim 35, wherein a potential of a scanning electrode becomes a first potential level  $V_{\text{gon}}$  when the scanning electrode is selected and becomes substantially a second potential level  $V_{\text{goff}}$  during a retention period in which the scanning electrode is not selected,

among common electrodes opposing pixel electrodes of a plurality of pixels belonging to the scanning electrode via a display medium,

a potential of the first common electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of a video signal applied to a video signal electrode corresponding to the first common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected,

a potential of the second common electrode becomes a first potential level  $V_c(+)$  in a case where a polarity of the video signal applied to the video signal electrode corresponding to the second common electrode is positive and a second potential level  $V_c(-)$  in a case where the polarity of the video signal is negative, when the scanning electrode is selected,

in a case where a difference between the first potential level  $V_c(+)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(+)$ , and a difference between the second potential level  $V_c(-)$  of the common electrode and a potential during a subsequent retention period is represented by  $\Delta V_c(-)$ ,

$\gamma$  represented by

25

$$\gamma = \alpha_{lc} V_{\varphi} / 2 \quad (\text{Formula 7})$$

$$(\text{where } V_{\varphi} = \Delta V_c(+) - \Delta V_c(-)) \quad (\text{Formula 8})$$

is set to be smaller in the portion away from the feeding ends in the screen, compared with the portion close thereto, and

$\beta$  represented by

$$\beta = \alpha_{gd} + \alpha_{lc} (\Delta V_{\infty} / \Delta V_{\text{gon}}) \quad (\text{Formula 9})$$

$$(\text{where } \Delta V_{\text{gon}} = V_{\text{gon}} - V_{\text{goff}}, \Delta V_{\infty} = [\Delta V_c(+) + \Delta V_c(-)] / 2 \quad (\text{Formula 10}))$$

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is set to be larger in the portion away from the feeding ends in the screen, compared with the portion close thereto.

SUBA 127  
43. A display apparatus according to claim 1 or 11, wherein the display medium is liquid crystal.

5 44. A display apparatus according to claim 43, which has a configuration forming a parallel plate capacitance in which a liquid crystal layer is interposed between the pixel electrodes and the counter electrode.

SUBA 137  
10 45. A display apparatus according to claim 22 or 32, wherein the display medium is liquid crystal.

15 46. A display apparatus according to claim 45, wherein the common electrodes are formed on the same substrate as that of the pixel electrodes, and the liquid crystal is operated by an electric field parallel to the substrate.

20 47. A display apparatus according to claim 1, 11, 22, or 32, wherein at least one of capacitances forming  $C_{\text{tot}}$  includes a capacitance formed by two conductive layers or semiconductor layers sandwiching an insulating layer therebetween, and an overlapping area of the two conductive layers or semiconductor layers is made different between the portion close to the feeding ends in the screen and the portion away therefrom, whereby  $\alpha_{\text{st}}$  or  $\alpha_{\text{lc}}$ , and  $\alpha_{\text{gd}}$  are allowed to have different values between the portion close to the feeding ends in the screen and the portion away therefrom.

SUBA 147  
25 48. A method for driving the display apparatus of claim 1 or 11, wherein after a potential is written to the pixel electrodes via the switching elements, a voltage is superimposed via  $C_{\text{st}}$  and has a value different between the portion close to the feeding ends in the screen and the portion away therefrom.

30 49. A method for driving a display apparatus according to claim 48, wherein, when a scanning electrode is selected, a first potential level  $V_c(+)$  is applied to common electrodes that are connection destinations of storage capacitance connected to pixel electrodes of a plurality of pixels belonging to the scanning electrode in a case where a polarity of a video signal is positive, and a second  
35 potential level  $V_c(-)$  is applied thereto in a case where a polarity of the video signal is negative.



SUBA157

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50. A method for driving a display apparatus according to claim 22 or 32, wherein after a potential is written to the pixel electrodes via the switching elements, a voltage is superimposed via  $C_{st}$  and has a value different between the portion close to the feeding ends in the screen and the portion away therefrom.

10

51. A method for driving a display apparatus according to claim 50, wherein, when a scanning electrode is selected, a first potential level  $V_c(+)$  is applied to common electrodes opposing pixel electrodes of a plurality of pixels belonging to the scanning electrode via a display medium in a case where a polarity of a video signal is positive, and a second potential level  $V_c(-)$  is applied thereto in a case where a polarity of the video signal is negative.

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52. A display apparatus for conducting a display by controlling a voltage applied to a display medium with a potential of pixel electrodes and applying voltages with both positive and negative polarities to the display medium, wherein a capacitive coupling voltage is superimposed on the pixel electrodes from electrodes other than pixel electrodes, and a distribution of the capacitive coupling voltage is made different in a display region between a case where a positive voltage is applied to the display medium and a case where a negative voltage is applied thereto.

20

53. A display apparatus according to claim 52, wherein the electrodes other than the pixel electrodes are common electrodes.

25

54. A display apparatus comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes, video signal electrodes; common electrodes; a counter electrode; a display medium interposed between the pixel electrodes and the counter electrodes; and storage capacitance formed between the pixel electrodes and the common electrodes,

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wherein a capacitive coupling voltage from the scanning electrode, and a capacitive coupling voltage from the common electrode are allowed to have a distribution in a screen, whereby flickering and a brightness gradient are corrected simultaneously.

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55. A display apparatus, comprising: a plurality of pixel electrodes arranged in

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a matrix; switching elements connected thereto; scanning electrodes, video signal electrodes; common electrodes; a display medium interposed between the pixel electrodes and the common electrodes; and storage capacitance formed between electrodes, other than the common electrodes opposing the pixel electrodes via the display medium and the scanning electrodes of the stage concerned, and the pixel electrodes,

wherein a capacitive coupling voltage from the scanning electrode, and a capacitive coupling voltage from the common electrode are allowed to have a distribution in a screen, whereby flickering and a brightness gradient are corrected simultaneously.

56. A display apparatus, comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes, video signal electrodes; common electrodes; a counter electrode; a display medium interposed between the pixel electrodes and the counter electrode; and storage capacitance formed between the pixel electrodes and either of the common electrodes,

wherein a plurality of the common electrodes that are connection destinations of the storage capacitance are connected to the pixel electrodes of a plurality of pixels belonging to one of the scanning electrodes.

57. A display apparatus, comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes, video signal electrodes; common electrodes; and a display medium interposed between the pixel electrodes and the common electrodes,

wherein a plurality of the common electrodes oppose the pixel electrodes of a plurality of pixels belonging to one of the scanning electrodes via the display medium.

58. A display element, comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes; video signal electrodes; common electrodes; a counter electrode; a display medium interposed between the pixel electrodes and the counter electrode; and storage capacitance formed between the pixel electrodes and the common electrodes,

wherein, in a case where a scanning electrode – pixel electrode capacitance between the pixel electrodes and the scanning electrodes is represented by  $C_{gd}$ , a common electrode – pixel electrode capacitance between

the pixel electrodes and the common electrodes is represented by  $C_{st}$ , and a total capacitance connected electrically to the pixel electrodes is represented by  $C_{tot}$ ,

$\alpha_{gd}$  and  $\alpha_{st}$  represented by

5

$$\alpha_{gd} = C_{gd}/C_{tot}, \quad \alpha_{st} = C_{st}/C_{tot} \quad (\text{Formula 1})$$

are set to be different values between a portion close to feeding ends in a screen and a portion away therefrom.

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59. A display element, comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes; video signal electrodes; common electrodes; a counter electrode; a display medium interposed between the pixel electrodes and the counter electrode; and storage capacitance formed between the pixel electrodes and either of the common electrodes, a plurality of the common electrodes that are connection destinations of the storage capacitance being connected to the pixel electrodes of a plurality of pixels belonging to one of the scanning electrodes,

15

wherein, in a case where a scanning electrode – pixel electrode capacitance between the pixel electrodes and the scanning electrodes is represented by  $C_{gd}$ , a common electrode – pixel electrode capacitance between the pixel electrodes and the common electrodes is represented by  $C_{st}$ , and a total capacitance connected electrically to the pixel electrodes is represented by  $C_{tot}$ ,

20

25  $\alpha_{gd}$  and  $\alpha_{st}$  represented by

$$\alpha_{gd} = C_{gd}/C_{tot}, \quad \alpha_{st} = C_{st}/C_{tot} \quad (\text{Formula 1})$$

25

are set to be different values between a portion close to feeding ends in a screen and a portion away therefrom.

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60. A display element, comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes; video signal electrodes; common electrodes; a display medium interposed between the pixel electrodes and the common electrodes; and storage capacitance formed between electrodes, other than the common electrodes opposing the pixel electrodes via the display medium and the scanning electrodes of the

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stage concerned, and the pixel electrodes,

wherein, in a case where a scanning electrode – pixel electrode capacitance between the pixel electrodes and the scanning electrodes is represented by  $C_{gd}$ , a common electrode – pixel electrode capacitance between the pixel electrodes and the common electrodes is represented by  $C_{lc}$ , and a total capacitance connected electrically to the pixel electrodes is represented by  $C_{tot}$ ,

$\alpha_{gd}$  and  $\alpha_{lc}$  represented by

$$\alpha_{gd} = C_{gd}/C_{tot}, \quad \alpha_{lc} = C_{lc}/C_{tot} \quad (\text{Formula 6})$$

are set to be different values between a portion close to feeding ends in a screen and a portion away therefrom.

61. A display element, comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes; video signal electrodes; common electrodes; a display medium interposed between the pixel electrodes and the common electrodes; and storage capacitance formed between electrodes, other than the common electrodes opposing the pixel electrodes via the display medium and the scanning electrodes of the stage concerned, and the pixel electrodes, a plurality of the common electrodes opposing the pixel electrodes of a plurality of pixels belonging to one of the scanning electrodes via the display medium,

wherein, in a case where a scanning electrode – pixel electrode capacitance between the pixel electrodes and the scanning electrodes is represented by  $C_{gd}$ , a common electrode – pixel electrode capacitance between the pixel electrodes and the common electrodes is represented by  $C_{lc}$ , and a total capacitance connected electrically to the pixel electrodes is represented by  $C_{tot}$ ,

$\alpha_{gd}$  and  $\alpha_{lc}$  represented by

$$\alpha_{gd} = C_{gd}/C_{tot}, \quad \alpha_{lc} = C_{lc}/C_{tot} \quad (\text{Formula 6})$$

are set to be different values between a portion close to feeding ends in a screen and a portion away therefrom.

62. A display apparatus, comprising: a plurality of pixel electrodes arranged in

a matrix; switching elements connected thereto; scanning electrodes; video signal electrodes; common electrodes; a counter electrode; a display medium interposed between the pixel electrodes and the counter electrodes; and storage capacitance formed between the pixel electrodes and the common electrodes, the scanning electrodes being supplied with a power only from one side of a display region, a potential of the common electrodes being fixed at least on a side opposite to the side where the scanning electrodes are supplied with a power in the display region,

wherein, in a case where a scanning electrode – pixel electrode capacitance between the pixel electrodes and the scanning electrodes is represented by  $C_{gd}$ , a common electrode – pixel electrode capacitance between the pixel electrodes and the common electrodes is represented by  $C_{st}$ , and a total capacitance connected electrically to the pixel electrodes is represented by  $C_{tot}$ ,

when a value of  $\alpha_{gd}$  represented by

$$\alpha_{gd} = C_{gd}/C_{tot} \quad \text{(Formula 101)}$$

in a portion furthest from feeding ends of the scanning electrodes in a display region is  $\alpha_{gd}(F)$ , there is a position where the value of  $\alpha_{gd}$  becomes larger than  $\alpha_{gd}(F)$  between the portion furthest from the feeding ends of the scanning electrodes in the display region and a portion closest thereto.

63. A display apparatus, comprising: a plurality of pixel electrodes arranged in a matrix; switching elements connected thereto; scanning electrodes; video signal electrodes; common electrodes; a display medium interposed between the pixel electrodes and the common electrodes; and storage capacitance formed between electrodes, other than the common electrodes opposing the pixel electrodes via the display medium and the scanning electrodes of the stage concerned, and the pixel electrodes, the scanning electrodes being supplied with a power only from one side of a display region, a potential of the common electrodes being fixed at least on a side opposite to the side where the scanning electrodes are supplied with a power in the display region,

wherein, in a case where a scanning electrode – pixel electrode capacitance between the pixel electrodes and the scanning electrodes is represented by  $C_{gd}$ , a common electrode – pixel electrode capacitance between the pixel electrodes and the common electrodes is represented by  $C_{lc}$ , and a

total capacitance connected electrically to the pixel electrodes is represented by  $C_{tot}$ ,

when a value of  $\alpha_{gd}$  represented by

5 
$$\alpha_{gd} = C_{gd}/C_{tot} \quad \text{(Formula 101)}$$

10 in a portion furthest from feeding ends of the scanning electrodes in a display region is  $\alpha_{gd}(F)$ , there is a position where the value of  $\alpha_{gd}$  becomes larger than  $\alpha_{gd}(F)$  between the portion furthest from the feeding ends of the scanning electrodes in the display region and a portion closest thereto.

64. A display apparatus according to claim 4, 7, 10, 15, 18, 21, 25, 28, 31, 36, 39, or 42, wherein a common electrode potential is different between a retention period after the pixel electrodes are charged with a positive video signal and a retention period after the pixel electrodes are charged with a negative video signal.

20 65. A display apparatus according to claim 3, 14, 24, or 35, wherein the scanning signal driving circuit conducts writing to a plurality of lines simultaneously.

66. A display apparatus according to claim 65, wherein the display medium is liquid crystal of an OCB mode.

25 67. A display apparatus according to claim 3, 14, 24, or 35, wherein the scanning signal driving circuit and the common electrode potential control circuit are formed on the same substrate as that of the switching elements.

30 68. A display apparatus according to claim 1, 11, 22, or 32, wherein the display medium is composed of a medium whose optical state is controlled with a current and auxiliary switching elements.

35 69. A display apparatus according to claim 68, wherein the medium whose optical state is controlled with a current is an organic electroluminescence medium.